

# Opioid use in pregnancy and Neonatal Abstinence Syndrome

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**UAB** MEDICINE

DEPARTMENT OF PEDIATRICS



Children's  
of Alabama



# Objectives

1. Understand the **magnitude, medicine and scope** of **neonatal abstinence syndrome**.
2. Obtain insights from **Ohio's statewide Neonatal/Perinatal Collaborative** work using QI methodology to improve NAS care.
3. Learn **concrete, data driven public health measures** and **best practice approaches** to the immense challenge of substance use in pregnancy.

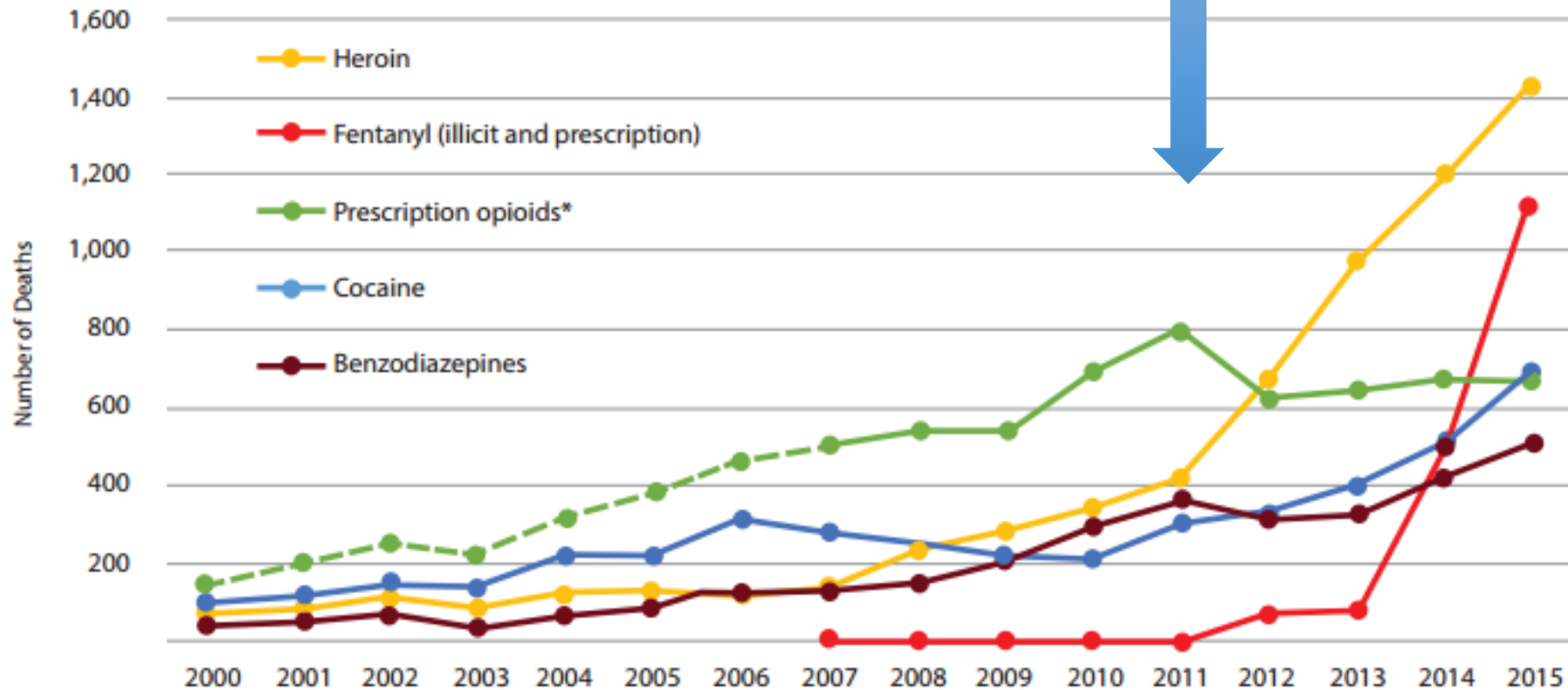
# Opioid Epidemic; Pregnant Moms and Babies 2000-2009

- 2000-2009 4 fold increase in OPR prescriptions.
- *Enough prescription opioids were prescribed in 2010 to medicate every American adult around-the-clock for a month.*
- US infants diagnosed with NAS increased x3
- *By 2009, 1 infant per hour accounting for \$720 million*



# Ohio Data:

Figure 5. Number of Unintentional Overdose Involving Selected Drugs, by Year, Ohio, 2000-2015



\* Prescription opioids not including fentanyl; fentanyl was not captured in the data prior to 2007 as denoted by the dashed line.

Source: Ohio Department of Health, Bureau of Vital Statistics; Analysis Conducted by ODH Injury Prevention Program.

Multiple drugs are usually involved in overdose deaths. Individual deaths may be reported in more than one category.

At delivery...



Abrupt adjustment to

- Extrauterine life AND
- A drug-free environment

**Withdrawal**



# What is Neonatal Abstinence Syndrome

- The clinical findings associated with **opioid** withdrawal has been termed the neonatal abstinence syndrome (NAS).
- Nearly all exposed infants will display some symptoms, but only a subset require treatment.

Opioid receptors concentrated in CNS and GI tract.

NAS affects baby's ability to be alert, sleep, eat, communicate cues





# CLINICAL FEATURES

Neurological Excitability	Autonomic Instability	GI Dysfunction
<ul style="list-style-type: none"><li>• Hyperirritability</li><li>• High-pitched inconsolable crying</li><li>• Agitation/Restlessness → Exoriations</li><li>• Difficulty sleeping</li><li>• Tremors</li><li>• Exaggerated Moro reflex</li><li>• Hypertonia</li><li>• Excessive motor activity</li><li>• Myoclonic jerks</li><li>• Uncontrolled, constant sucking</li><li>• Seizures (2-11%)</li></ul>	<ul style="list-style-type: none"><li>• Apnea</li><li>• Bradycardia</li><li>• Tachypnea</li><li>• Nasal flaring</li><li>• Nasal stuffiness</li><li>• Temperature instability</li><li>• Sweating</li><li>• Sneezing</li><li>• Mottling</li><li>• Yawning</li></ul>	<ul style="list-style-type: none"><li>• Diarrhea → electrolyte disturbances, dehydration, perianal skin excoriation</li><li>• Hyperphagia (may require up to 150 kcal/kg/d)</li><li>• Regurgitation</li><li>• Vomiting</li><li>• Poor feeding</li><li>• Poor weight gain/FTT</li></ul>



# Clinical Timeline



SUBSTANCE	ONSET (hours)	DURATION (days)
Heroin	24-48	8-10
Methadone	48-72	Up to 30+
Buprenorphine	36-60	Up to 28
Prescription opioids	36-72	10-30
Polypharmacy	??	??
Fentanyl	??	??



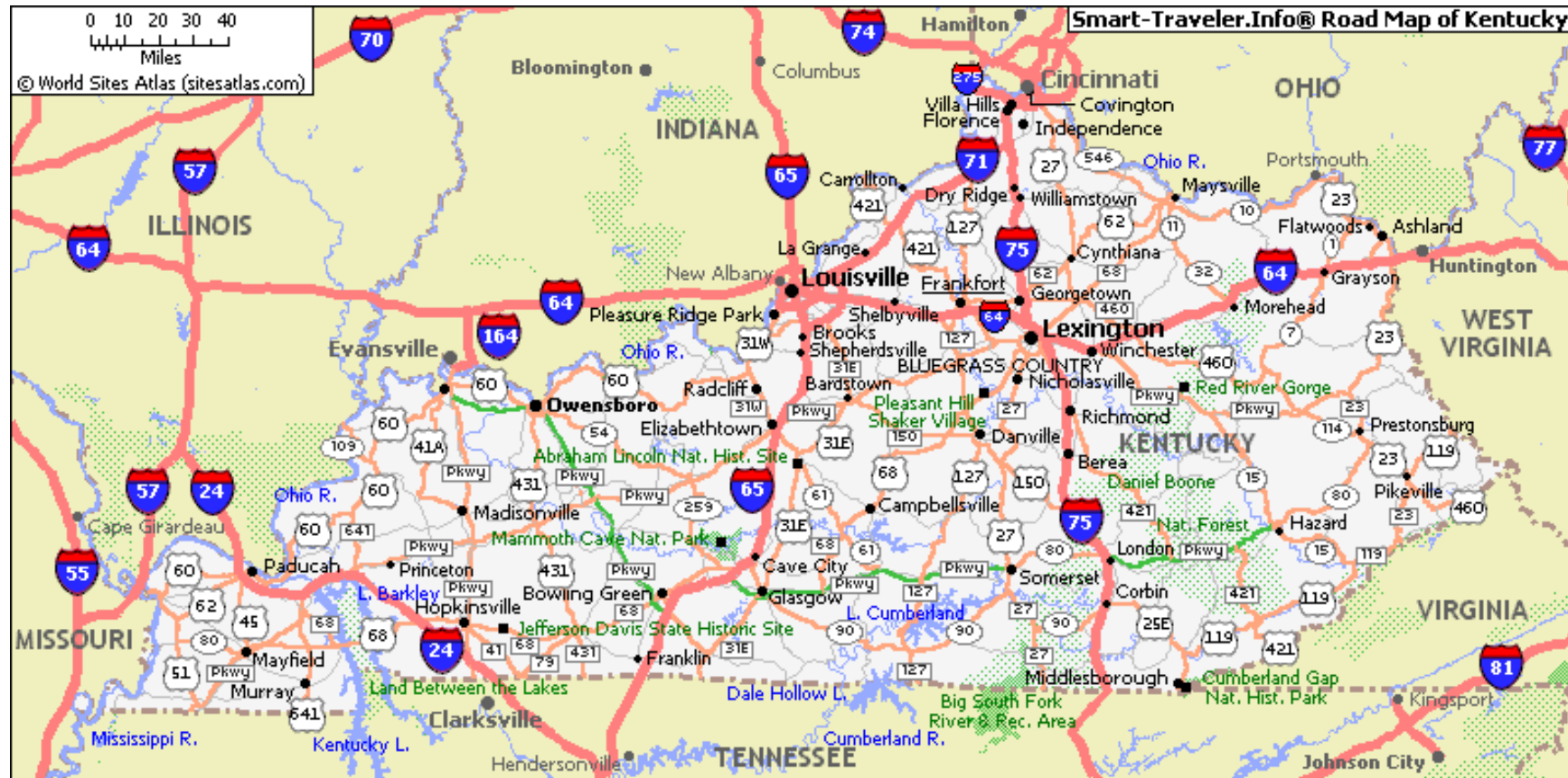
# Discharge at 48 hrs???

- AAP (2014 and 2017)
- WHO (2014)
- Known fetal exposure: 4-7 days!
- 1 in 5 has onset after 48 hrs



- Withdrawal at home...
  - Poor feeding
  - Vomiting and diarrhea
  - Extreme irritability
  - Sleep challenges
- DEHYDRATION
- SEIZURES
- RISK FOR CHILD ABUSE

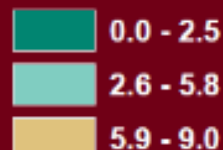
# A Big Road Runs Through It



**Five-year Weighted Average from 2005 to 2009**

**ADAMHS Board**

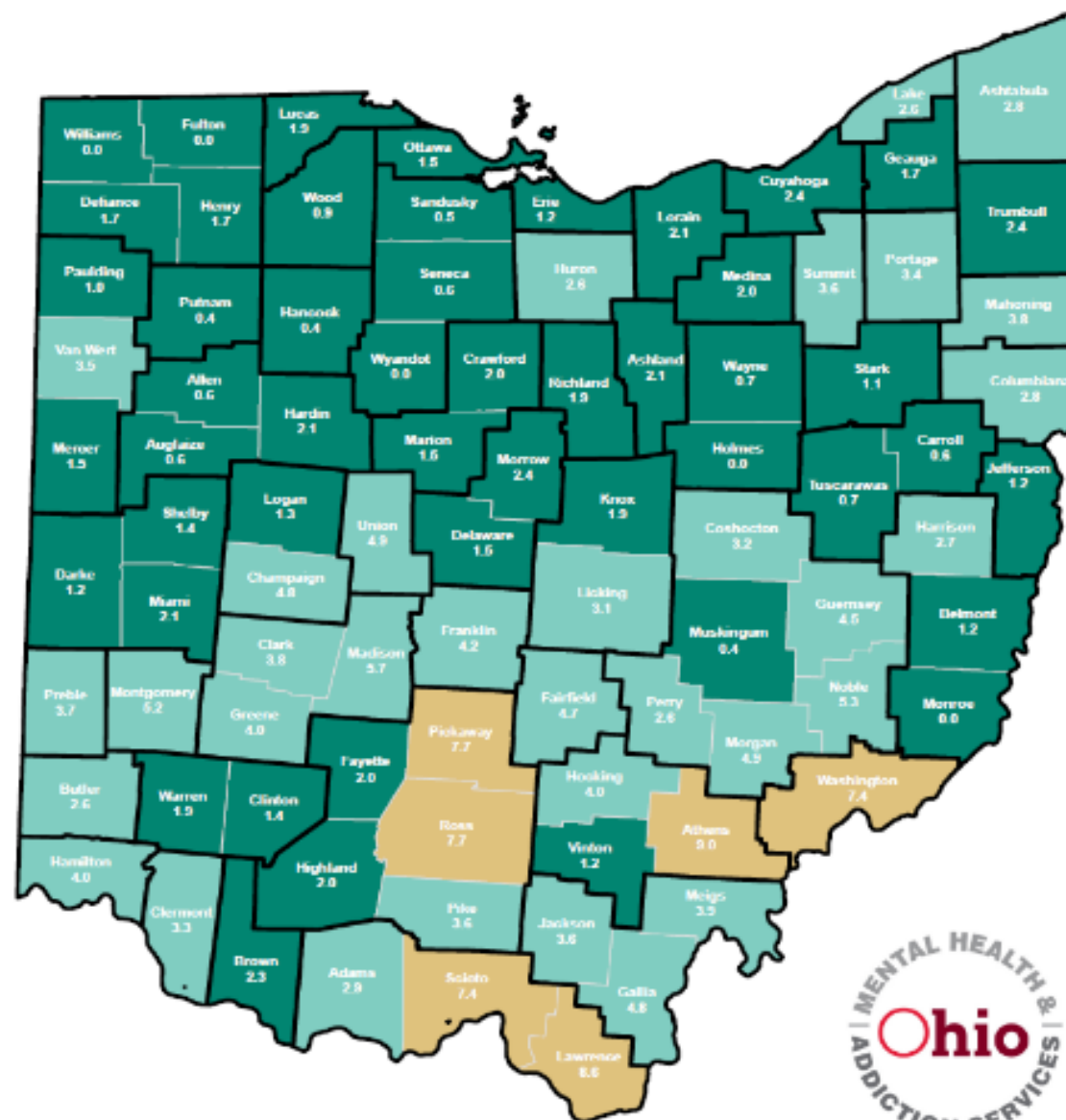
## Rate per 1,000



This map examines the discharge rates for neonatal abstinence syndrome (NAS; ICD-9 779.5) per 1,000 live births in Ohio by county of patient residence. On average, there were 3.0 discharges for NAS per 1,000 live births statewide between 2005 and 2009. Counties with the highest rates of NAS discharges were Athens (9.0), Lawrence (8.6), Pickaway and Ross (both 7.7). NAS discharge rates for five counties were at or close to zero during this time.

**Note: Alcohol, Drug Addiction and Mental Health Services (ADAMHS) Boards have black borders, and counties have white borders. Borders are black in cases where ADAMHS boards and counties have the same borders.**

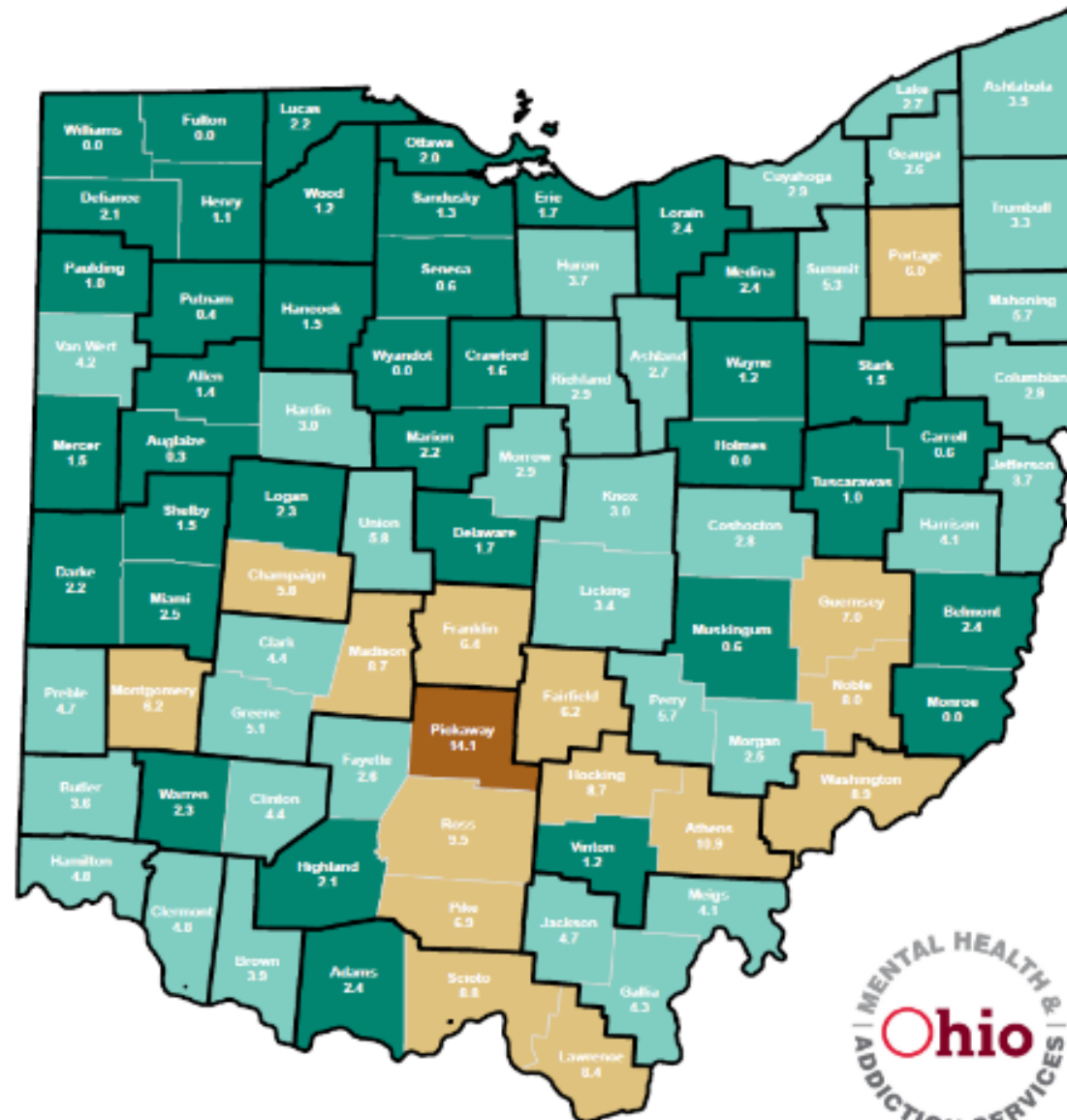
**Data Source:**  
Data adapted by OhioMHAS from  
the Ohio Hospital Association &  
the Ohio Department of Health  
Map produced March 2014



**Five-year Weighted Average from 2006 to 2010**

## 11.1 - 14.1

**Data Source:**  
Data adapted by OhioMHAS from  
the Ohio Hospital Association &  
the Ohio Department of Health  
Map produced March 2014





# Discharge Rates for Neonatal Abstinence Syndrome per 1,000 Live Births

Five-year Weighted Average from 2007 to 2011

## Legend


 ADAMHS Board

Rate per 1,000

 0.0 - 2.5

 2.6 - 5.8

 5.9 - 11.0

 11.1 - 24.5

## Map Information:

This map examines the discharge rates for neonatal abstinence syndrome (NAS; ICD-9 779.5) per 1,000 live births in Ohio by county of patient residence. On average, there were 5.3 discharges for NAS per 1,000 live births statewide between 2007 and 2011. Counties with the highest rates of NAS discharges were Scioto (24.5), Pickaway (18.4) and Pike (18.3). NAS discharge rates for four counties were at or close to zero during this time.

Note: Alcohol, Drug Addiction and Mental Health Services (ADAMHS) Boards have black borders, and counties have white borders. Borders are black in cases where ADAMHS boards and counties have the same borders.

Data Source:  
Data adapted by OhioMHAS from  
the Ohio Hospital Association &  
the Ohio Department of Health  
Map produced March 2014



**Five-year Weighted Average from 2008 to 2012**

ADAMHS Board

0.0 - 2.5

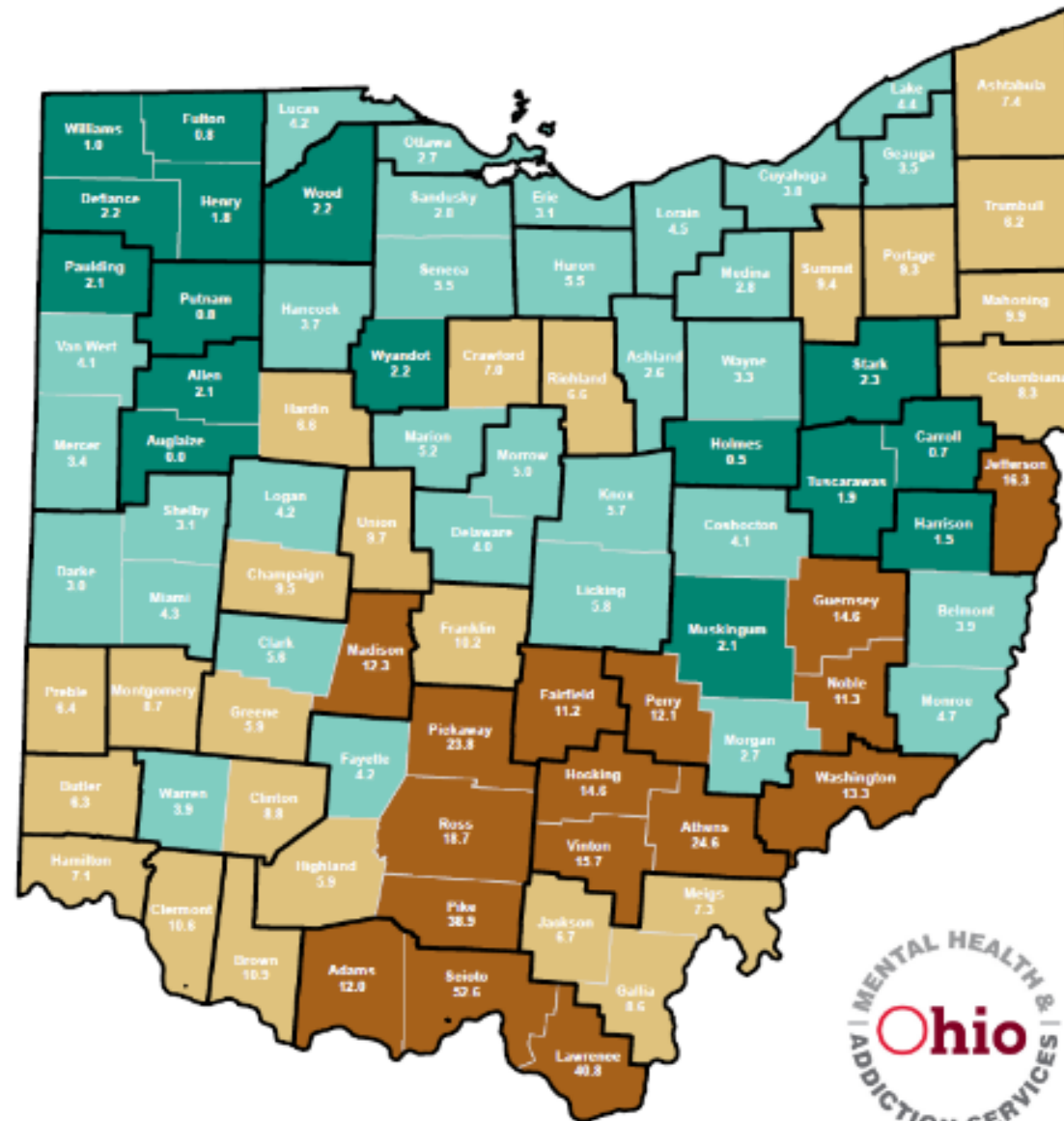
2.6 - 5.8

5.9 - 11.0

11.1 - 52.6

This map examines the discharge rates for neonatal abstinence syndrome (NAS; ICD-9 779.5) per 1,000 live births in Ohio by county of patient residence. On average, there were 6.9 discharges for NAS per 1,000 live births statewide between 2008 and 2012. Counties with the highest rates of NAS discharges were Scioto (52.6), Lawrence (40.8) and Pike (38.9). Carroll (0.7), Holmes (0.5) and Auglaize (0.0) counties had the lowest rates of NAS discharges.

**Data Source:**  
Data adapted by OhioMHAS from  
the Ohio Hospital Association &  
the Ohio Department of Health  
Map produced March 2014







## Ohio Children's Hospital Association

Saving, protecting and enhancing children's lives



# Projects: OCHA & OPQC



- Sept. 2012 – Sept. 2014
- Six children's hospitals and their affiliates
  - (20 total hospitals)
- 994 infants
- Included **only** infants that required pharmacological treatment for NAS



- January 2014-June 2016
- 54 sites:
  - 26 Level II NICU's
  - 26 Level II Special Care Nurseries
  - 2 Normal Newborn Nurseries
- 6131 infants in the database
- Includes infants that receive **both** non-pharmacological AND pharmacological treatment

## Improve Consistency in Modified Finnegan Scoring

### Key Driver:

**Attain high reliability  
in NAS scoring by  
nursing staff**

### Intervention:

**Fulltime RN staff at  
Level 2 and 3 hospitals  
to complete D'Apolito  
NAS scoring training  
video and achieve 90%  
reliability.**

- All sites use same tool
- Train RN staff to 90% reliability in scoring using D'Apolito Training System
- OPQC has sent out DVD's to each site

# Pharmacological Bundle

## Key Driver:

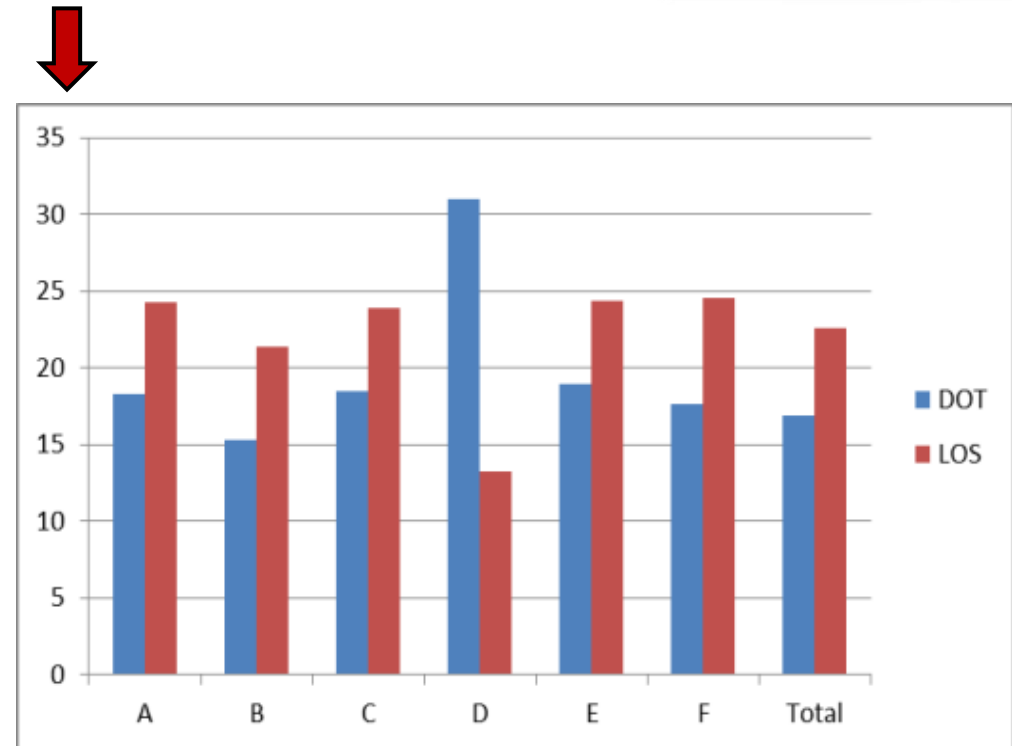
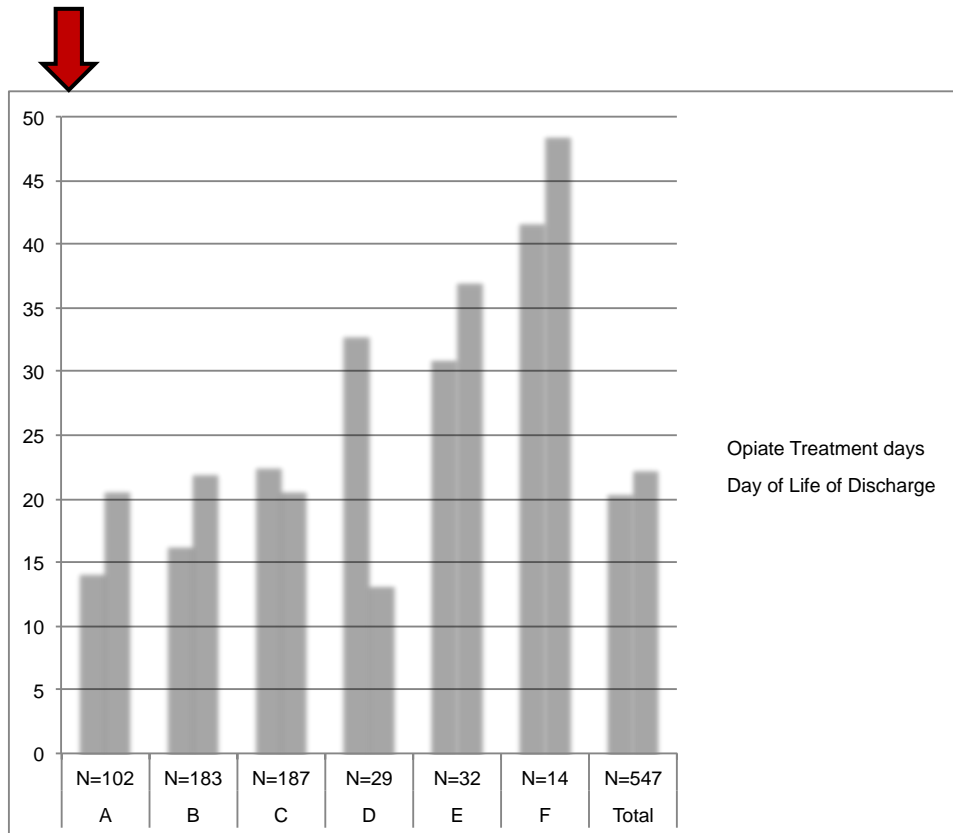
**Standardize NAS Treatment Protocol**

- **Initiate Rx If NAS score > 8 twice.**
- **Stabilization/ Escalation Phase**
- **Begin wean when stable for 48hrs**
- **Discharge home after 48hrs (Morphine) to 72hrs (Methadone)**



# Impact of Ohio OCHA Weaning Protocol

- 2012-2014 with 199 centers.
- N=3458 infants with NAS



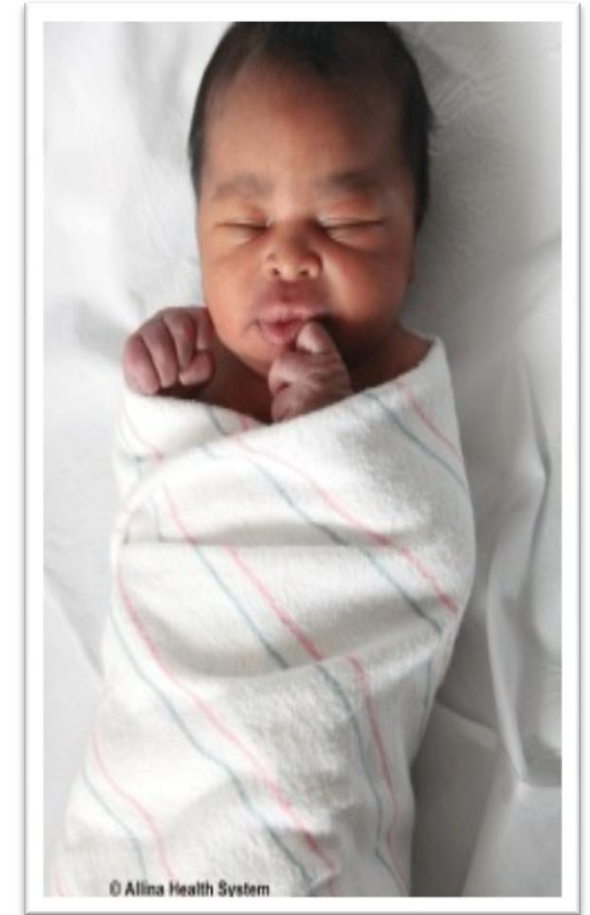
# Non-Pharmacological Bundle

## Key Driver:

**Optimize Non-Pharmacologic  
Rx Bundle**

## Intervention

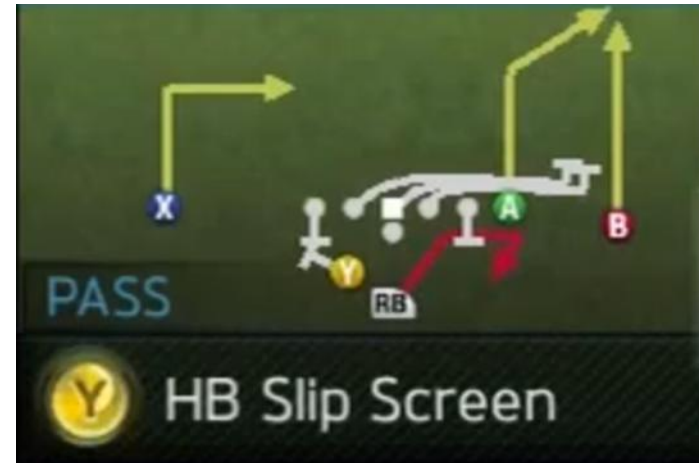
- Swaddling, low stimulation.
- Encourage kangaroo care
- Feed on demand-
  - MBM if appropriate
  - lactose free
  - 22 cal formula



# METHODS OF SCREENING/TESTING

- Maternal Interview Screen
- Maternal Urine Drug Test
- Infant Urine Drug Test
- Meconium Toxicology Test
- Umbilical Cord Toxicology Test

## Screen vs. Test





# Risk based screen

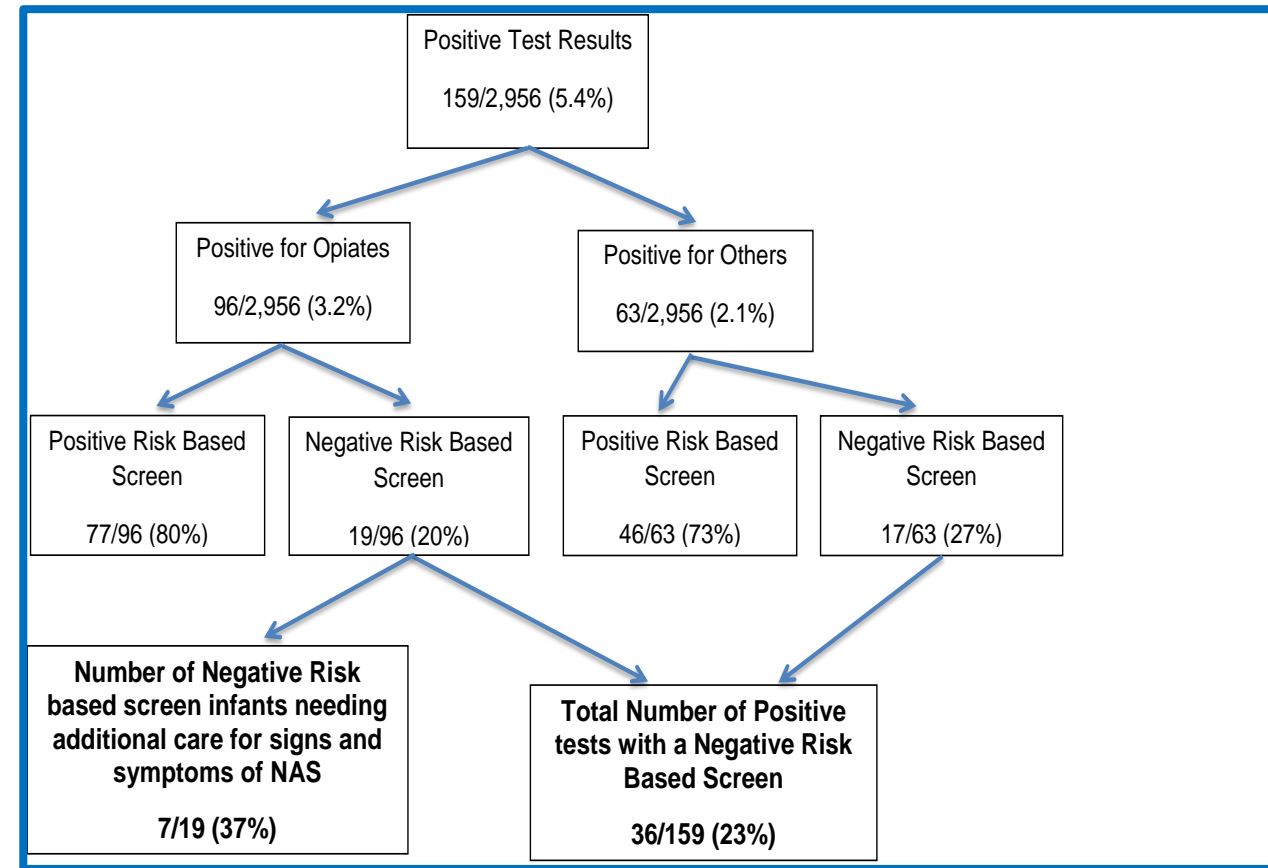
**Table I. Maternal risk-based screen used at Mercy Anderson Hospital before universal testing**

Documented, suspected, or acknowledged maternal history of drug use  
Insufficient prenatal care, defined as starting care after 12 weeks gestation  
Placental abruption  
Admission from a justice center  
Positive for HIV  
Positive for hepatitis B surface antigen  
Positive for hepatitis C virus  
Maternal history of gonorrhea or syphilis

- In 2012 Mercy Hospital Anderson cared for:
- 1,868 neonates born to 1,874 women
- 96% were Caucasian,
- 52% were married, and
- 51% had private insurance

# Universal Testing Pilot

- We evaluated the efficacy of a universal testing protocol for all mothers in a community hospital setting that experienced a three-fold increase in neonatal abstinence syndrome (NAS)



# Universal Testing, OH/KY

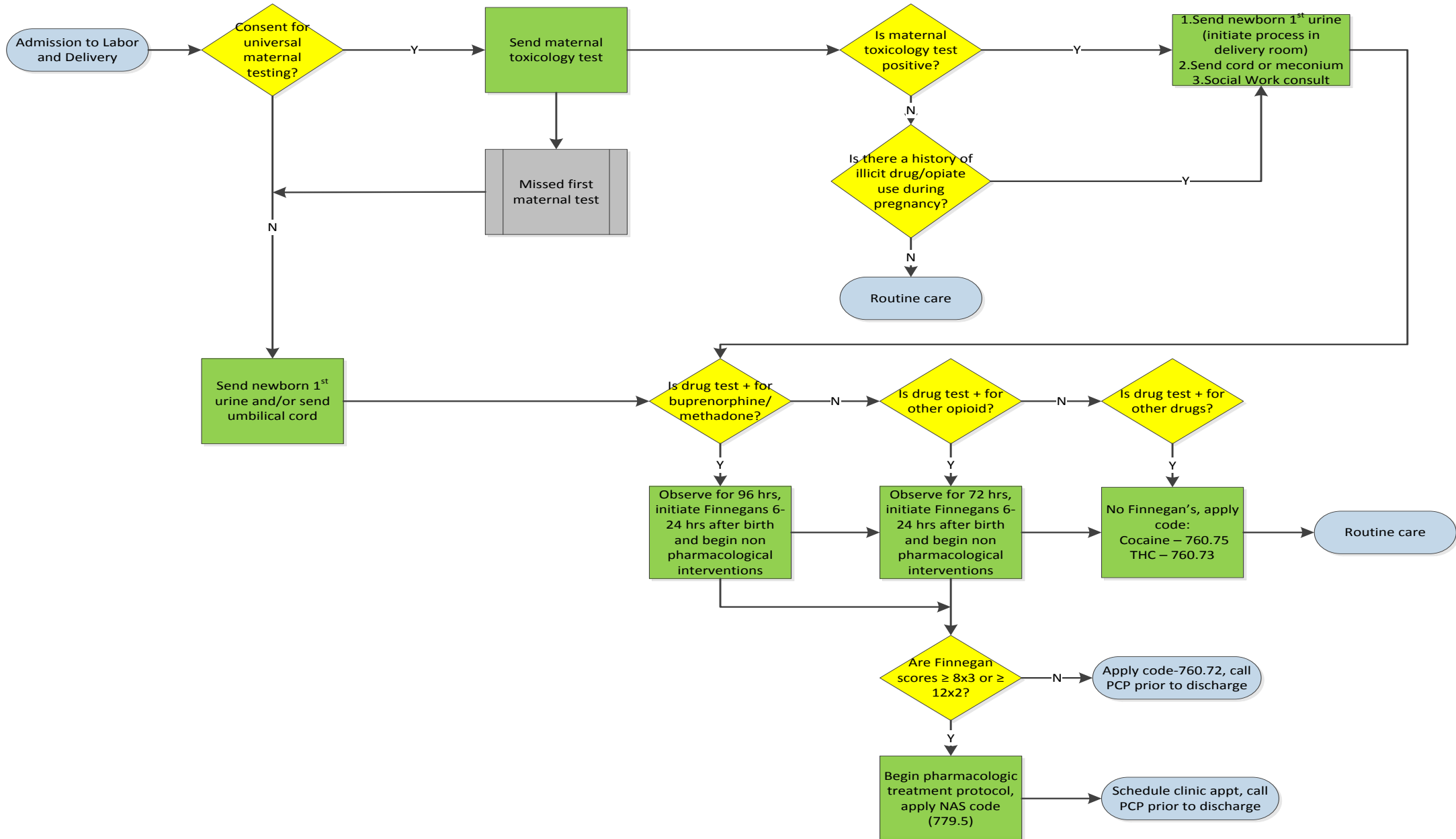


- 18 hospitals in our region now doing universal testing (2015)
- Being able to start nonpharmacological bundle earlier, may lead to a decrease in percentage of infants requiring medications for NAS.

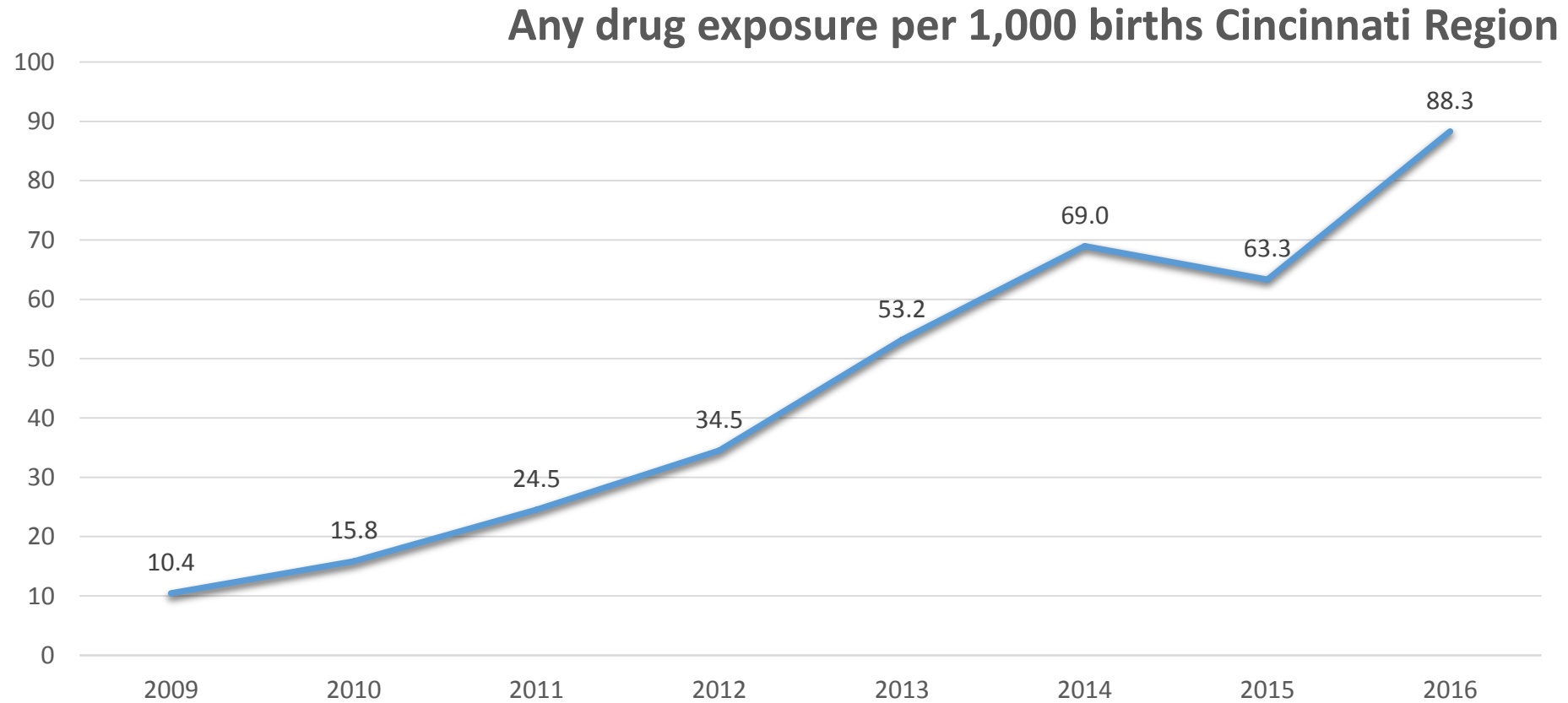
Delivery Service Hospitals  
Atrium Medical Center  
The Christ Hospital  
Dearborn County Hospital  
Kettering Health Network  
Highland District Hospital  
Margaret Mary Hospital  
Mercy Health Partners  
St. Elizabeth Hospital  
TriHealth  
UC Health

# Perinatal Institute Neonatal Abstinence Syndrome Management Process Map

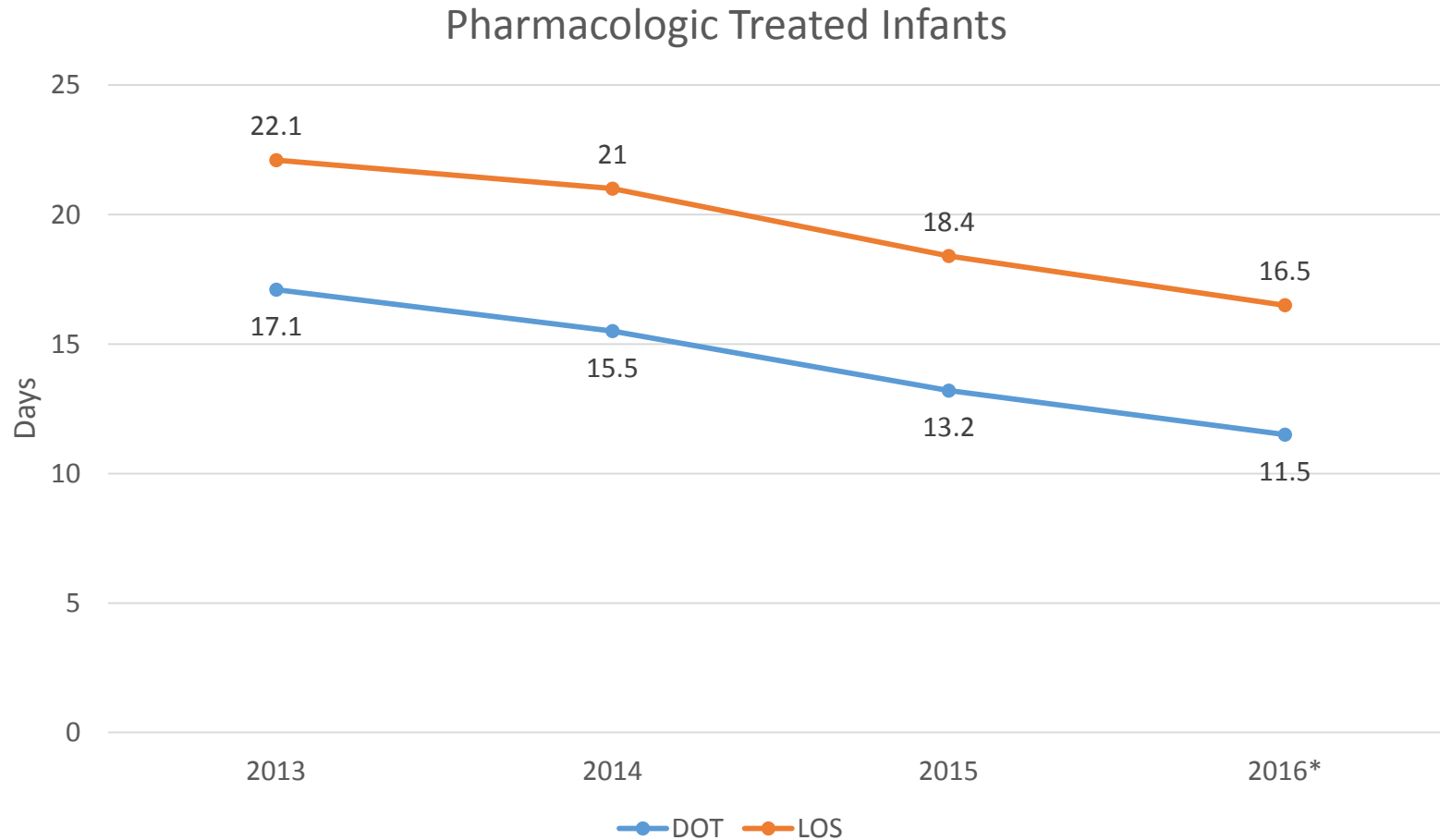
This is a suggested guideline, each hospital may have unique circumstances which requires a different process than suggested



Cincinnati Region: Drug Exposure Rate per 1,000 births  
(8.5 fold increase)  
Data from delivery hospitals ICD9/ICD10 codes



# LOS and DOT for NAS infants CCHMC Perinatal Institute



# Breastfeeding and Substance Use

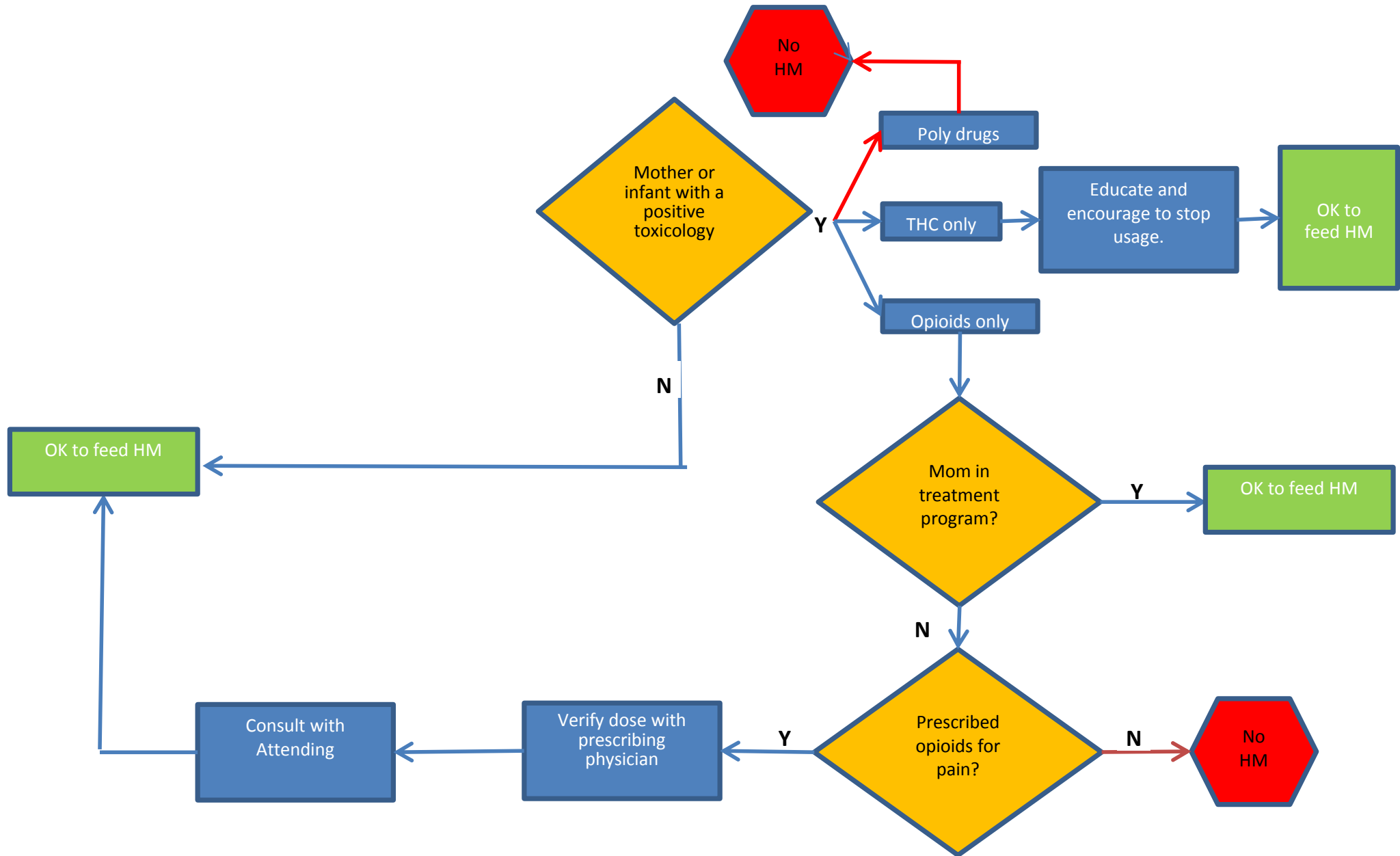




# Breastfeeding and Substance Use

- AAP committee recommends all mothers in methadone/buprenorphine treatment be allowed to breast-feed regardless of dose.
- Data suggests a protective effect on the rate of NAS. (May be non-pharm bundle effect)
- HCV and HBV not contraindication for breast feeding
- HIV contraindications in developed countries

# Breastfeeding and maternal substance use--Perinatal Institute



# Criminal Justice Approaches to Substance Use in Pregnancy


“**Prosecution** and **punishment** of pregnant women who use illicit substances, have no proven benefits for infant health.”

Formally affirmed by:



American Academy of Pediatrics  
American Association of Family Practice  
American College of OB/GYN  
American Nurses Association  
American Medical Association  
American Psychiatric Association  
National Perinatal Association  
American Society of Addiction Medicine  
March of Dimes  
American Public Health Organization

# Chemical endangerment



Ohio parents arrested after 8-year-old son overdosed on heroin, police say

By Amy B Wang February 20

Ohio parents arrested after 8-year-old found with heroin in system <https://t.co/E4sXV4EwXE> [pic.twitter.com/6qSp8SCm2x](https://pic.twitter.com/6qSp8SCm2x)

— WPXI (@WPXI) February 18, 2017



# Chemical Embarrassment

**LOCAL 12.COM** WKRC CINCINNATI

NEWS WEATHER SPORTS STATION COMMUNITY HEALTH CIRCA

ADVE

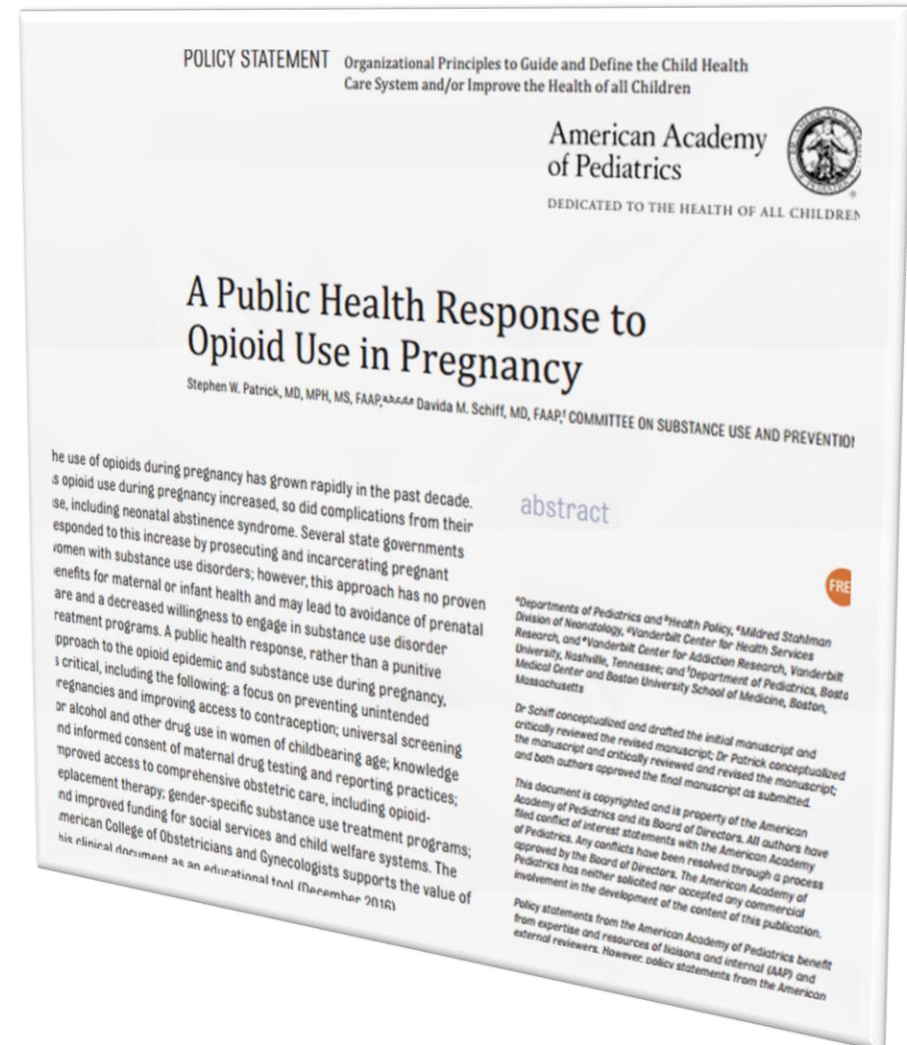
## Parents overdose in their 7-month-old baby's Children's Hospital room

by Larry Davis | Thursday, January 7th 2016



# *Pediatrics*, 2017;139(3)

- Primary Prevention
- Improved Identification and Access to Treatment
- Criminal Justice Approach

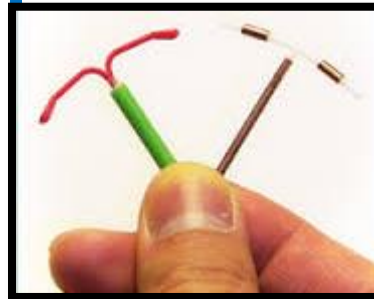


# Primary Prevention

- 1) Provider education re: abuse
- 2) Bolstering PDMP's
- 3) Proper disposal
- 4) Empower law enforcement around illegal prescribing.



- Unintended pregnancy : 31-45% vs 85-90% in SUD women



- LARC!!!!



# Identification/Treatment/Criminal Justice

- Opioid agonist therapy
  - Medication assisted treatment
- Coordinated effort with transparency and communication
- Funding for EI, DHR

